1999 HERD UNIT CLASSIFICATION OF ROOSEVELT ELK IN REDWOOD NATIONAL AND STATE PARKS (RNSP)

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INTRODUCTION

Annual classification data of Roosevelt elk in RNSP are important to document relative abundance and simple population characteristics. Wallen (1997) identified elk data needs, management questions and recommendations for long term monitoring. As in years past, Fish and Wildlife staff accompanied the Wildlife Population class taught by Luke George (Humboldt State University) on an elk classification field trip. However, no students were available this year to make independent counts.

METHODS

During 1999, classification counts were conducted opportunistically by Fish and Wildlife Branch staff while performing other field surveys. Additionally, field visits to herd areas were made solely for classification counts. Classification counts were performed by driving or hiking throughout the parks and using binoculars and spotting scopes to determine the age and sex of elk observed. The survey areas (herd units) were as follows:

(1) The South Operations Center (SOC) herd
(2) The Davison Ranch/Berry Glen herd (considered to be the same animals)
(3) The Elk Prairie/101 Bypass herd (considered to be the same animals)
(4) Gold Bluffs beach herd(s); (dispersed)
(5) Bald Hills herd(s); (dispersed over wide area-probably many discrete herds)
(6) Lower Redwood Creek herd
(7) Red schoolhouse herd (outside of RNSP)

Elk herds are classed into groupings of individuals by relative age and sex:

- Calves, usually young of the year, not differentiated by sex. Calves are easily distinguished soon after birth (end of May, early June in RNSP) by spotted coat and small size; as they age and the spots disappear, they grow quickly, but still retain a short, rounded snout (compared to the more pointed snouts of cows and yearling females).
- Cows (yearling and adult females).
- Spikes (year old males exhibiting only a main beam, with brow tine absent).
- Mature bulls (two years old and older, with at least a brow tine evident off the main beam).

Rating criteria are used to evaluate the classification conditions and the observer's confidence in the count data:

1= Good, visibility good and animals were close enough to observe with high confidence that the classification is accurate.
2= Fair, animals are either distant or not fully cooperative for good confidence in classification. Maybe observation time is reduced due to movement in to cover

3= Poor, animals are so far away that it is difficult to keep track of separate individuals or some animals are known to be in the adjacent hiding cover. Qualify the observation in the notes section.
4= Unacceptable, visibility poor due to darkness, fog or totally uncooperative animals.

RESULTS

Classification counts are performed to determine the ratios of calves/cows and bulls/cows. The ratio of calves to cows is an indication of herd productivity (e.g., the greater numbers of calves produced, the healthier the herd and it's associated range). When calf numbers drop, a number of factors may be responsible: poor range condition, usually caused by elk over utilizing the available forage; disease; poaching; excessive predation (generally not a factor in RNSP). Bull/cow ratios are more important in hunted populations (or those subject to poaching pressure), due to overharvest of mature bulls. Nutrition can also be a factor on overpopulated range, since bulls are more susceptible to additional stresses during the rut, where they eat little or not at all.

Harper et al (1985) reported that calf / 100 cow ratios for Roosevelt elk in Oregon average 39 (range = 32 to 47). The Oregon estimates were from herd units that also were subject to hunting mortality. In a late 1970's RNSP study, Mandel and Kitchen (1979) considered their average ratio observed (20 calves/100 cows) to be low; the study did not attempt to classify herd units in the Bald Hills, however. Bull/cow ratios are not as critical an indicator in an unhunted population, and are not tabulated.

The following tables record herd unit observations; each table applies to a herd unit.

ELK COUNTS 1999 SOC HERD										
Location	**Observers**	**Date**	**MB**	**SP**	**CW**	**CV**	**Tot**	**Rate**	**Notes**	**UTM**
SOC	Wallen	5/28/99	17	2	14	0	**33**	2	Bulls were separate from cows	N 4569680 E 410235
SOC	Max	7/27/99	6	1	13	4	**24**	1	5 Bulls in bachelor herd separate	N 4569680 E 410235
SOC	Falvey	8/11/99	6	1	13	4	**24**	1	4 Bulls in bachelor herd separate	N 4569680 E 410235
SOC	Falvey	8/16/99	1	1	12	4	**18**	1		N 4569680 E 410235
SOC	Falvey Childers	10/25/99	8	1	13	4	**26**	1	7 Bulls in bachelor herd separate	N 4569680 E 410235
SOC	Sakai	10/27/99	1	1	12	5	**17**	1	Bull chasing spike; one cow looked emaciated	N 4569680 E 410235
SOC	Falvey	10/28/99	7	1	8	4	**20**	2	Through scope	
SOC	Falvey Kimmer	11/4/99	6	1	12	4	**23**	1	5 Bulls in bachelor herd separate	
Total counts of cows and calves (From highest count total with best rating)					**13**	**4**			**31/100 calves/cows**	

The SOC herd provides the most reliable observations on the small grassland between the administrative buildings and the wetland. F&W Branch received many reports of injured (limping) elk. All follow-ups resulted in negative confirmation. At some point in the future, the herd will exceed the limited grazing capacity of this grassland area; many animals routinely jump the fence to graze on adjacent private lands. Additionally, the herd utilizes the grassy areas between the administrative trailers at night (evidenced by the large amounts of elk scat). Burning of this grassland should be considered as a management option to increase forage and attempt to keep the animals on park property.

ELK COUNTS 1999 RED SCHOOLHOUSE										
Location	**Observers**	**Date**	**MB**	**SP**	**CW**	**CV**	**Tot**	**Rate**	**Notes**	**UTM**
E of 101	Max	8/17/99	4	10	46	21	**81**	2		N 4564000 E 408800
Total counts of cows and calves					**46**	**21**			**46/100 calves/cows**	

Only one observation was made this season; this herd is well outside the park boundary, and can be difficult to observe safely with the amount of traffic on highway 101. The branch needs to decide if classification counts of this herd will continue in the future.

ELK COUNTS 1999 LOWER REDWOOD CR.										
Location	**Observers**	**Date**	**MB**	**SP**	**CW**	**CV**	**Tot**	**Rate**	**Notes**	**UTM**
On levee	Max	8/12/99	4				**4**	1		N 4572100 E 412700
River bottom	Falvey	8/24/99	6	2	26	10	**44**	1	Yearling cow had flesh wound-left hindquarter	N 4572300 E 412300
River bottom	Falvey	10/27/99	7	2	32	5	**46**	2	6 bulls in separate herd-raining hard, large herd bunched	N 4572300 E 412650
River bottom	Falvey Kimmer	11/4/99	3				**3**	1	Rest of herd in brush off of trailhead rd. No count possible	N 4572300 E 412650
Total counts of cows and calves (From highest count total with best rating)					**26**	**10**			**38/100 calves/cows**	

This herd can be difficult to observe until they begin to use the levee above Redwood Creek (usually by December). When in the river bottom, they are often screened by vegetation. It is unknown at present how far up Redwood Creek (from highway 101) the herd travels. When not visible from highway 101, surveyors can park at the Redwood Creek Trailhead, and proceed to the river bottom to attempt a count. On a number of class count attempts this year, the herd was in the dense alders between the road to the trailhead and the creek, making accurate counts impossible. Undoubtedly, this herd also crosses the fence line to gain access to private ranch land on the north end of Orick. Evidence of poaching was discovered while branch personnel were surveying for herpetofauna last season; carcass remains were found in the timber above the horse trail's entrance to Orick Ridge.

ELK COUNTS 1999 ELK PRAIRIE/BYPASS HERD										
Location	**Observers**	**Date**	**MB**	**SP**	**CW**	**CV**	**Tot**	**Rate**	**Notes**	**UTM**
Elk Prairie	Wallen	5/12/99	3	1	8	2	**14**	2		
Elk Prairie	Wallen	6/17/99	2	1	12	2	**17**	2		
Boyes Prairie	Sakai	9/10/99	4	2	10	2	**18**	2		
Bypass	Falvey	10/14/99	1	2	15	8	**26**	1		
Total counts of cows and calves (From highest count total with best rating)					**15**	**8**			**53/100 calves/cows**	

This herd has shifted it's activity to the 101 Bypass; many times they are found on the steep banks adjoining the freeway, which makes them difficult to count. Few mature bulls were noted this year; they may spend more time in the dense timber.

ELK COUNTS 1999 DAVISON/BERRY GLEN

Location	Observers	Date	MB	SP	CW	CV	Tot	Rate	Notes	UTM
S of Rd	Falvey Childers	1/25/99	14	3	39	5	**61**	1		N 4574225 E 412810
S of Rd	Falvey Wallen	2/23/99				1	**1**		**Dead calf-starvation**	N 4574225 E 412810
S of Rd	Wallen	6/7/99	0	3	31	0	**34**	?	No rating listed	N 4574225 E 412810
S of Rd	Wallen	6/13/99	1	1	33	2	**37**	2		N 4574225 E 412810
N of Rd	Max	8/17/99	14				**14**	1		N 4575050 E 413110
S of Rd	Max	8/18/99	2	2	31	7	**42**	1		N 4574225 E 412810
S of Rd	Falvey	10/25/99	1	4	24	6	**35**	3	Average of 3 counts-elk bedded in tall grass	N 4574225 E 412810
Berry Glen	Falvey Kimmer	11/4/99	1	4	30	6	**41**	2	Elk bunched together-**several elk appeared emaciated-ribs clearly visible**	N 4574200 E 413950
Total counts of cows and calves (From highest count total with best rating)					**31**	**7**			**23/100 calves/cows**	
Davison	Falvey Holden	12/2/99	13	5	32	5	**55**	2	**16/100** calves/cows on **this count done after final report submitted.** Some calves looked emaciated	

This herd has shown evidence of poor nutrition (animals emaciated, dead calf found with bone marrow in poor condition). They have also been using the cleared area at Berry Glen more than in the past, creating a potential traffic hazard when tourists jam the small pull-off to view the herd. Many observation attempts in Davison Prairie were unsuccessful, since the animals often bed down in the tall grass. Observations of this herd takes more time than would be expected to gain an accurate count.

ELK COUNTS 1999 GOLD BLUFFS BEACH										
Location	**Observers**	**Date**	**MB**	**SP**	**CW**	**CV**	**Tot**	**Rate**	**Notes**	**UTM**
¼ mile S of campground	Falvey Childers	1/25/99	6				**6**	1		N 4581100 E 410600
¼ mile N of Ossagon	Falvey Childers	1/25/99			10		**10**	2		N 4588500 E 411300
250 yds N Ossagon	Falvey	6/14/99			1	1	**2**	1	Cow w/newborn	N 4588300 E 411300
150 yds N Ossagon	Falvey	6/15/99	2		16		**18**	3		N 4588200 E 411300
By campground	Falvey	6/17/99	4				**4**	1		N 4581500 E 410600
200 yds N of Fern Canyon	Falvey	6/17/99	2		25		**27**	2	No calves noted	N 4584400 E 411100
By campground	Max	8/17/99	5				**5**	1		N 4581500 E 410600
Kiosk	Falvey	8/25/99	3				**3**	1		N 4578700 E 410100
N Picnic area	Falvey	8/25/99	4				**4**	1		N 4583500 E 411010
½ mile N of Fern canyon	Falvey	8/26/99	1		17		**18**	2	No calves noted	N 4585000 E 411100
¼ mile N of campground	Falvey	9/20/99	2		14	1	**17**	1		N 4581900 E 410600
Total counts of cows and calves					**14**	**1**			**7/100 calves/cows**	

The dispersal of animals throughout the approximately 10-mile beach strand makes determining sub-herd numbers difficult. This year's counts were all obtained while performing other field duties. The low ratio of calves/cows is due more to a lack of quality observations and limited time spent counting the herd(s). Many visitors have been noted approaching elk too closely, despite numerous warning signs in the area. Based on limited observations of forage quality (which appears to be poor), it is surprising that no elk carcasses have been found. If a carcass is found, the bone marrow should be examined to indicate the animal's condition.

ELK COUNTS 1999 BALD HILLS										
Location	**Observers**	**Date**	**MB**	**SP**	**CW**	**CV**	**Tot**	**Rate**	**Notes**	**UTM**
E of Coyote Rock-on Rock Fk.Rd.	Childers	4/13/99	3	0	0	0	**3**	1	¼ mile SE of drainage E of Coyote Rock	N 4553100 E 427300
S of BH Rd. ½ mile E of Jct. w/Lookout Rd	Falvey	5/19/99	2	0	48	2	**52**	2	52 minimum in herd-possibly 2 calves (saw only small heads in grass)	N 4554700 E 427100
Childs Hill Prairie	Childers	7/1/99	0	0	15	8	**23**	1	¼ mile NW of BH Rd and Williams Rd Jct.	N 4556820 E 424855
S of BH Rd across from Lookout Rd Jct.	Falvey	8/16/99	4	6	62	20	**92**	2	Many bedded down-herd bunched.	N 4555300 E 426600
From Lookout	Gina (Look-out)	8/31/99	1	1	8	1	**11**	1	Seen from tower-exact location unk.	?
Robber's Gulch Rd.	Falvey	10/27/99	3	0	36	3	**42**	3	Elk running-in dense oaks.	N 4556100 E 425475
Total counts of cows and calves (From highest count total with best rating)					**62**	**20**			**32/100 calves/cows**	

Elk Camp	Falvey	8/16/99	0	1	8	0	**9**	3	Probably others down slope-angle very steep	N 4564150 E 419100
Elk Camp	Max	8/30/99	3	0	14	4	**21**	2	1 cow had red ear tag on left ear	N 4564150 E 419100
Lane Ranch/ Elk Camp	Falvey	10/27/99	1	1	17	1	**20**	3	200 yds downslope of parking lot-elk bedded	N 4555450 E 425110
Total counts of cows and calves (From highest count total with best rating)					**14**	**4**			**29/100 calves/cows**	

It is unrealistic to combine data for the herds observed in the Bald Hills. Many of the class counts occur miles apart, and a better organization of sightings needs to be developed (see recommendations). The Elk Camp herd for example, may not ever mix with the herds surrounding Schoolhouse Peak, and counts are tabulated separately.

HARVEST DATA FROM HUNTS ADJACENT TO RNSP

The California Department of Fish and Game (CDFG) administers hunting on private lands immediately adjacent to RNSP lands. Currently, there are two units managed for elk hunting: the Smith River Unit, and the Klamath Unit (including Simpson Timber Co. lands east of the Bald Hills Road). Harvest data was obtained from Karen Kovacs, area Wildlife Biologist with CDFG. In 1998, the Smith River Unit harvest was five mature bulls and nine cow elk; the Klamath Unit harvest was seven mature bulls. In 1999, another unit was added on Yurok lands. The total harvest in the three units was: one cow elk from the Yurok Unit; five bulls and eight cows from the Smith River Unit; and seven bulls from the Klamath Unit. CDFG is planning on adding another private land unit in the Stone Lagoon area.

DISCUSSION

One of the greatest difficulties of obtaining accurate classification counts in RNSP is revealed in counts of Bald Hills and Gold Bluffs Beach herds. These areas are relatively large geographic units, and elk are dispersed throughout in sub-herds during the summer. The herds begin to group together in winter, when the calves have grown larger and are harder to differentiate from yearling cows. Combining the data from all observations in these areas does not provide a truly accurate cow/calf ratio. Until discrete herds (and the areas they utilize within the units) can be identified, averaging the data is problematic. The smaller herds at SOC, Davison, Elk Prairie/Bypass, lower Redwood Creek, and Red Schoolhouse areas tend to group together in more discrete units, making cow/calf ratios easier to determine. These herds tend to be more habituated to humans, so observations are more reliable. The Gold Bluffs herds are also relatively habituated, and observations can be made of individual groups; however, their dispersal throughout the beach corridor makes it difficult to ascertain discrete units. The Bald Hills herds undoubtedly receive more poaching pressure, making them difficult to observe for any length of time. There has also been a sanctioned hunt on Simpson Timber lands adjacent to the park in the Bald Hills, so these animals are also subject to hunting pressure for a short time in early September.

Table 1. Summary of calf/100 cow ratio for each herd unit for 1996 to 1999.				
Location	**1996**	**1997**	**1998**	**1999**
Bald Hills	25	20	32	32
Elk Camp/Lane Ranch	No data	No data	No data	29
Davison Ranch	23	27	18	23
Elk Prairie/Bypass	8	33	24	53
L. Redwood Creek	39	11	15	38
South Operations	45	35	29	31
Gold Bluffs Beach (one count of calf w/cows)	No data	38	12	7
Stone Lagoon (one count only)	23	12	16	46

It is difficult to make meaningful comparisons of calf/cow ratios per herd from year to year due to the variability in sampling. The fact that observability of many herds is difficult and the low numbers of sample counts mean that our ratios may not accurately reflect natural changes in calf production. More intensive sampling is needed to compare observations within herds and between herds.

RECOMMENDATIONS

For future counts in the Bald Hills (BH) and Gold Bluffs Beach (GBB) areas, surveyors should group observations into separate areas. At GBB, groupings (for later class counts) should be as follows:
1) From Mussel Point/Kiosk area to south of campground (GBB-S)
2) From campground to N.Picnic area/Fern Canyon parking lot (GBB-middle)
3) From n of Fern Canyon to Ossagon Rocks/Carruthers Cove area (GBB-N)

While elk undoubtedly move between these areas, this zoning may be helpful in determining which areas of the beach receive more use (after a number of years of class counts have been obtained). The BH area presents a more difficult problem. For example, the prairies around the Schoolhouse Peak area often have two or three herds utilizing them. Separating out unit areas here is feasible, but complicated. BH groupings:
1) Ganns Prairie (usually a small herd of bachelor bulls)
2) Elk Camp/Lane Ranch
3) Dolason (upper and lower)
4) Counts Hill/Airstrip Prairies (divider between Counts and Childs Hill is Cagle Ridge)
5) Copper Cr. (includes Childs Hill/Maneze, Williams Ridge, and Robber's Gulch area)
6) Coyote Cr. (includes Lyons Ranch Prairies and large prairies S-SE of Schoolhouse Peak)

If two or more herds are classed within an area, they can be designated herd #1, herd #2, etc. UTM's are useful to determine where in a zone the herd was seen. Additionally, **any obvious physical characteristics of animals within the herd should be noted;** this would help to determine individual animals (and their associated herds) upon future sightings within the same season.

Since many surveys specifically to obtain elk classification have been unsuccessful this season (animals bedded in timber, fog, etc.), park personnel in other branches can assist with classifications of herds on an opportunistic basis. F&W Branch personnel can provide field training for interested employees. Branch staff should also seek to obtain volunteers (students) from the Humboldt State University (HSU) Wildlife program. Students could obtain class counts on weekends (after training by branch staff).

RNSP should submit a project proposal for future graduate student work through HSU on determining herd units (and migration between herds) in the Bald Hills area.

LITERATURE CITED

Mandel, R.D. and D.W. Kitchen. 1979. The ecology of Roosevelt elk in and around Redwood National Park. Humboldt State University, Arcata, CA. Park Contract #PX8480-8-0045.

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